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Annealing Temperature Dependence of the Magnetic Moment Observed in ZnO Nanotips Implanted with Mn JEREMY RALEY[1], Air Force Institute of Technology, JEAN WEI, Air Force Research Laboratory, YUNG KEE YEO, ROBERT HENGEHOLD, MICHAEL MARCINIAK, Air Force Institute of Technology, PAN WU, YICHENG LU, Rutgers, The State University of New Jersey — Magnetic properties of Mn ion-implanted ZnO nanotips grown on quartz substrates have been investigated as a function of anneal temperature. This work tracks the strength of the coercive (H_C) and remanent (B_R) fields of these samples as a function of anneal temperature over a range of 675 to 800 ^{o}C for a period of 10 or 20 min in flowing O_2. The results show that the magnetic properties are highly dependent on anneal temperature. It has been found that 750 ^{o}C is the optimal anneal temperature for producing the greatest values of H_C and B_R, and a noticeable drop is observed when this annealing temperature is exceeded. This observation is true for magnetic moment measurements at both 5 and 300 K. The presence of an optimal temperature above which H_C and B_R decrease seems to indicate that post annealing causes magnetic activation and ordering in this material. These observations would not be expected if the ferromagnetic effects observed in this material were due purely to clusters, precipitates, or secondary phase formation.

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